

# A LITERATURE SURVEY ON MAZE SOLVING AND OBJECT DETECTING ROBOT

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**Abstract** In this paper, literature survey on MAZE SOLVING ROBOT is carried on various papers which has the ability to navigate automatically in an unknown area based on its own decision. Every paper has its own methodology for designing and implementing the robot. At the end the results are compared to find the most efficient one, followed by proposed system.

**Key Words:** LSRB(Left straight right back), Breadth First Search , Unmanned Automobile

## 1.INTRODUCTION

A maze is a network of paths designed as puzzles through which one has to find a way. Dense network of city streets, disaster prone regions and war torn environments have common navigational difficulties. These shortcomings range from navigating through obstruction or wreckage on a possible route, navigating around dead ends to figuring out new and complex paths . Specific missions, hazardous surroundings, inhabitable conditions serve as reason for the shift to autonomous technology and decision oriented mechatronics. Another reason to opt for autonomous technology or unmanned vehicles is that these are introduce conservative ways or rescue of survivors due to its impeccable, refined and numerous reviewed decision making and being able to enter a scene or an environment, locate objectives and exit the quickest and most effective way possible whilst eliminating obstructions. As the Internet of Things (IoT) is expected to grow bigger, the IoT based on the Internet has been applied in real life. Service applications provided by the IoT have been used in various fields, such as health care, home care, safety, automotive, energy, environment, and agriculture. Several algorithms have been developed to provide obstacle recognition, collision avoidance, and faster route searching when autonomous vehicles are driving, which are equipped with various sensors and Arduino and Raspberry Pi based

moving objects. The following proposed systems have used various algorithms for maze solving.

## 2. RELATED WORKS

**2.1** Akib Islam ,Farogh Ahmad ,P.Sathya “**SHORTEST DISTANCE MAZE SOLVING ROBOT**”

,2016(International Journal of Research in Engineering and Technology)

In this paper, a robot is designed that consists of two infrared sensors, one ultrasonic sensor, arduino UNO microcontroller, pair of motors, pair of wheels and wheel rotation encoder. The robot is capable of scanning the area ahead for obstacles with the help of ultrasonic sensor.. The robot is also equipped with 2 infrared sensors facing right and left to detect the walls. One infrared sensor is placed facing the floor. A wheel rotation encoder is placed near each wheel to measure the extend of how much the wheel is rotating. By knowing the diameter of wheel, the rotation can be converted to distance travelled. The robot is programmed with an algorithm that helps it to navigate the entire maze until it finds the end. This uses LSRB(Left straight right back) and RSLB(Right straight left back) algorithms to navigate through the maze.

**2.2** Rahul Kumar, Peni Jitoko “**MAZE SOLVING ROBOT WITH AUTOMATED OBSTACLE AVOIDANCE**”, 2016 (IEEE).

In this paper, autonomous maze solving robot is developed with independent mapping and localization skill. Firstly, the maze solving vehicle is designed with three infrared sensors of which two is used for wall detection to avoid collision and the third is for obstacle detection for picking and placing the objects to clear its pathway with the help of robotic arm. Also, it desires to use robot where an environment unreachable for human. In addition, there are also places where use of robots is the only way to achieve a goal. For this, appropriate placement of sensory devices is

very critical. The aim is not only to solve maze automatically but also to avoid obstacles in the way of propagation. The main objective is to pick and place the objects on its path and solve the maze successfully. It uses wall follower algorithm. The logic of the wall follower algorithm is observing being in a dark room and finding one's way using the walls of an enclosure and doing this (either with your left or right hand), the solver would eventually make its/his/her way out of the maze.

**2.3 Sang-Chul Kim, Goo-Hoon Byun "DEVELOPMENT OF MAZE ESCAPE ALGORITHM USING RASPBERRY PI- BASED MOVING OBJECT FOR THE SERVICES OF UNMANNED AUTOMOBILE", 2018**(Journal of Theoretical and Applied Information Technology)

In this paper, a self-propelled vehicle is developed using Raspberry Pi that performs the mission of finding the root to escape from the maze which is used as key algorithm for the services of unmanned automobile. For the mission of maze escape, the line tracing and intersection discrimination algorithms have been developed using Raspberry Pi. Various situations that occur during the experiments have been studied and solutions to solve them have been investigated. As the related research, a front collision avoidance system that avoids obstacles by recognizing the distances between moving object and obstacles when performing the mission of maze escape has been developed and a lane- keeping system between vehicles by employing various algorithms using the Raspberry Pi and Arduino was developed.

**2.4 Mohammad O.A.Aqel, Ahmed Issa, Majde Elhabbash "INTELLIGENT MAZE SOLVING ROBOT BASED ON IMAGE PROCESSING AND GRAPH THEORY ALGORITHMS", 2017**(International Conference on Promising Electronic Technologies).

This paper proposes an intelligent maze solving robot that can determine its shortest path on a line maze based on image processing and artificial intelligence algorithms. The image of the line maze is captured by a camera and sent to the computer to be analyzed and processed by a program developed using Visual C++ and OpenCV libraries and based on graph theory algorithms. The camera should be calibrated in order to get its intrinsic and extrinsic parameters. Camera calibration is a necessary step in computer vision which provides the ability to establish a relation between 2D image pixels coordinates and real-world coordinates. The developed program solves the captured maze by examining all possible paths exist in the maze that could convey the robot to the required

destination point. After that, the best shortest path is determined and then the instructions that guide the car-like robot to reach its desired destination point are sent to the robot through Bluetooth.

It uses Breadth First Search, Best First Search and A\* algorithms. The end results of using each algorithms are compared in order to find the more efficient one.

**2.5 J.Arun Pandian , R.Karthick , B.Karthikeyan "MAZE SOLVING ROBOT USING FREEDUINO AND LSRB ALGORITHM"**( International Journal of Modern Engineering Research).

This paper deals with the development maze robot using simple circuits. A MSR (maze solving robot) is a clever little gadget with a silicon brain that finds its way through an arbitrary maze. It competes against other members of its species, racing as fast as it can. Here MSR is an electro-mechanical device, typically consisting of three main subsystems. They are drive system, an array of sensors, and the control system. It uses the LSRB(Left straight right back) algorithm in order to find the fastest way to solve the maze.

### 3. PROPOSED SYSTEM

The robot can be made more efficient by attaching a camera module onto it that captures images from which objects can be detected. The main objective of the proposed system is to build a robot that can solve the maze in shortest time possible. Perform smooth movement. To provide a good interaction between microcontroller and other mechanical elements. To ensure software efficiency. It can be used as a guide for fire fighters, can be used to solve navigation problems, can be used in military search and rescue operations and can be also be used by archeologist. Thus making it more efficient.

### 3. CONCLUSIONS

From the above literature survey, we can infer that maze solving robot can be developed with various algorithms such as LSRB(Left straight right back) and RSLB(Right straight left back) algorithms to navigate through the maze and find the shortest path. Moreover it can be made more efficient by adding additional features such as object detection using camera module .

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## REFERENCES

- [1] Akib Islam ,Farogh Ahmad ,P.Sathya “**SHORTEST DISTANCE MAZE SOLVING ROBOT**” ,2016(International Journal of Research in Engineering and Technology)
- [2] Rahul Kumar,Peni Jitoko “**MAZE SOLVING ROBOT WITH AUTOMATED OBSTACLE AVOIDANCE**”, 2016 (IEEE).
- [3] Sang-Chul Kim, Goo-Hoon Byun “**DEVELOPMENT OF MAZE ESCAPE ALGORITHM USING RASPBERRY PI-BASED MOVING OBJECT FOR THE SERVICES OF UNMANNED AUTOMOBILE**”,2018(Journal of Theoretical and Applied Information Technology)
- [4] Mohammad O.A.Aqel, Ahmed Issa, Majde Elhabbash “**INTELLIGENT MAZE SOLVING ROBOT BASED ON IMAGE PROCESSING AND GRAPH THEORY ALGORITHMS**”, 2017(International Conference on Promising Electronic Technologies).
- [5] J.Arun Pandian , R.Karthick , B.Karthikeyan “**MAZE SOLVING ROBOT USING FREEDUINO AND LSRB ALGORITHM**”( International Journal of Modern Engineering Research).